

TRACHONURUS ROBINSI, A NEW SPECIES OF
GRENADIER (GADIFORMES, MACROURIDAE) FROM THE
PHILIPPINES

Tomio Iwamoto

ABSTRACT

Trachonurus robinsi is described from 26 specimens collected by the steamer ALBATROSS in the semi-enclosed basins of the Sulu, Camotes, Mindanao, and Sibuyan seas, where it is apparently endemic. It is a species of small adult size, probably not longer than about 25 cm in total length, and is characterized by its relatively low count of pectoral fin rays and scale rows on body, short barbel, narrow suborbital, and high spinule count on body scales. Two related species, *T. sentipellis* Gilbert and Cramer and *T. sulcatus* (Goode and Bean), previously placed in the synonymy of *T. villosus* (Günther), are considered valid.

Gilbert and Hubbs (1920), in their revisionary study of grenadiers, identified as *Trachonurus villosus* (Günther, 1877) a large series of 44 specimens collected at 18 stations in the Philippines and Indonesia during the 1907-1910 cruise of the ALBATROSS. My reexamination of that material revealed that the 26 specimens captured in the semi-enclosed basin collectively including the Sulu, Sibuyan, Camotes, and Mindanao seas were not *T. villosus* but instead represented a similar but distinct, undescribed species. Gilbert and Hubbs's misidentification is attributable partly to Günther's inadequate original description of *T. villosus*, and also because the several species in the genus have relatively few diagnostic characters that enable ready identification. Marshall (1973), in fact, synonymized all four nominal species of *Trachonurus* with *T. villosus*, an action Iwamoto in Cohen et al. (1990: 290) questioned. The purpose of the present paper is to (1) describe the new Philippine species, (2) better characterize the type species, *T. villosus*, and (3) document the differences between the new species and *T. villosus*, the Hawaiian species *T. sentipellis* Gilbert and Cramer, 1897, and the Atlantic species *T. sulcatus* (Goode and Bean, 1885).

METHODS AND MATERIALS

Methods for making counts and measurements and abbreviations generally follow Iwamoto (1970) and Iwamoto and Sazonov (1988). The small *i* in front of the numerals given for the pectoral fin ray count indicates the presence of a rudimentary splintlike ray closely attached to the base of the uppermost ray. Scale rows below the second dorsal are counted from the origin of the second dorsal posteroventrally to the anal fin, with those above separated by "... + 1 + ..." from those below the lateral line. In Table 3 the scale row count represents only those above the lateral line. Institutional abbreviations for specimen depositories follow Leviton et al. (1985).

DESCRIPTION

Family MACROURIDAE
Trachonurus Günther, 1887
Trachonurus robinsi new species
Figure 1

Trachonurus villosus: Gilbert and Hubbs, 1920: 564 (non *Coryphaenoides villosus* Günther, 1877) (in part, specimens from Sibuyan, Camotes, Mindanao, and Sulu seas only; 514-1344 m).

Diagnosis.—Pectoral fin rays i9-i13; total gill rakers on inner side of first arch 9-11; scales below midbase of first dorsal fin 3-5.5, scales below origin of second

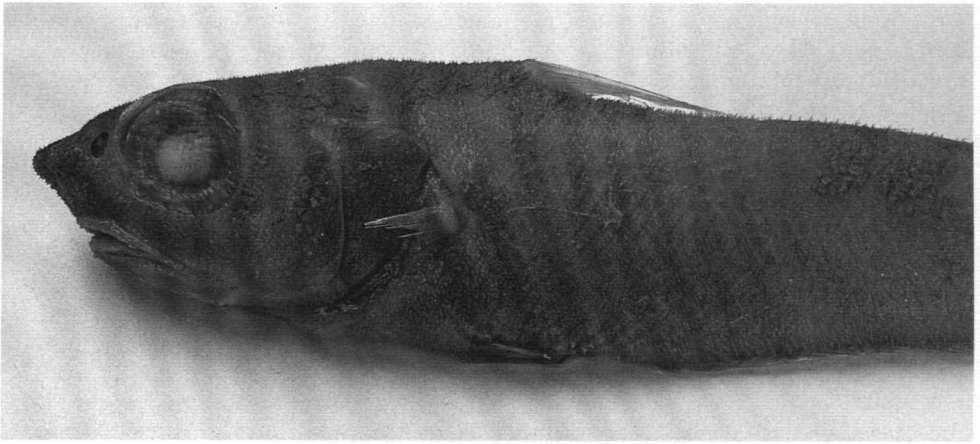


Figure 1. *Trachonurus robinsi* new species. Holotype, CAS-SU 25438 (207 mm TL), Mindanao Sea, 1240 m; ALBATROSS st. 5494.

dorsal fin (4–6)+1+(7–10) (total 12–15). Suborbital width 2.8–4.1 into orbit diameter; barbel 4.3–7.4. Scales between first dorsal and lateral line with 9–21 spinules. Scales on gular membrane absent or in narrow patch; scales on branchiostegal membranes absent or few isolated scales near anterior end. Species of small adult size, probably not longer than 25 cm TL.

Counts and Measurements (see also Tables 1–3; holotype first, followed by paratypes and other specimens in parentheses).—1D. II,8 + 154 (II,6–9); P. i12 (i9–i13); V. 6 (6–7); total GR-I (inner) 9 (9–11), GR-II (outer/inner) 10 (9–10)/10 (9–11); scales below 1D. 5 (5–7), below midbase 1D. 4 (3–5.5); below 2D. (4–6)+1+(6–10), total 12 (12–15, 17 in one); lateral line scales over distance equal to predorsal length 33 (27–37, usually less than 34); pyloric caeca 9 (6–9).

Total length of specimens examined 91+–570+ mm; HL 13.2–96.0. The following in percent HL: snout 26 (23–30); preoral 17 (14–20); internasal 20 (17–24); interorbital 32 (28–34); orbit 33 (29–36); suborbital 9 (9–11); postorbital 40 (39–45); orbit to preopercle 30 (26–32); upper jaw 31 (28–33); barbel 6 (4–9); outer gill slit 12 (12–18); preanal 153 (146–167); outer pelvic to anal 39 (30–41); body depth 71 (66–77); 1D.-2D. interspace 34 (28–45); height 1D. 65 (59–81); length outer pelvic ray 39 (34–67); posterior nostril 7 (6–13).

Description of Holotype (paratype ranges noted in parentheses).—Head length 6.7 (5.4–7.1) in TL, greatest width about 2.1 (1.8–2.1) in HL; body depth at point three head lengths behind snout tip about 0.9 (0.8–1.0) orbit diameter. Snout conical, pointed in lateral view, bluntly obtuse viewed dorsally, protruding about 0.5 orbit diameter beyond mouth, tipped with broad, low scutelike scale armed with short, stout spinules (terminal scale not prominently protruding but nevertheless producing a definite terminal apex). Nasal bones stout, not easily bent; internasal width 1.6 (1.4–1.8) into interorbital width. Jaws subterminal, extending posteriorly to below midorbit. Chin barbel short (length usually much less than suborbital width), distally slender. Preopercular margin broadly rounded, the posterior portion inclined slightly forward of vertical; preopercle ridge not especially raised, vertical portion with shallow inflection, posteroventral portion not forming a distinct lobe. Interopercle with broadly exposed ventral and posterior margin.

Teeth in jaws short, conical, deeply embedded in dense bed of papillae forming

gums of jaws; premaxillary teeth in moderate bands, 3–5 teeth across widest anterior portion, tapering rapidly posteriorly to one row near end of rictus, outer series slightly enlarged. Mandibular teeth similar to those of premaxillary in shape, size, and disposition except band somewhat shorter posteriorly, falling short of end of rictus.

Scales adherent, of moderate size, coarsely covered with short, stout, conical, erect spinules. Head and body surfaces fully scale covered except for gular and branchiostegal membranes, which in holotype mostly naked with only single isolated scale on branchiostegal membrane (squamation on these membranes in other specimens variable, from gular membrane broadly covered to scaleless, and branchiostegal membrane with small patches, to few isolated scales, to no scales). Exposed surfaces of interopercle covered with one or two rows of coarsely spinulated scales. Surfaces of shoulder girdle covered by operculum abruptly naked. Body scales of moderate size, those along anal fin base rather elongate and with comblike diagonal array of 4–6 spinules. Scales between first dorsal and lateral line with 11–18 (5–25, size dependent) short, sharp, erect spinules, all lacking definite arrangement. Scales on opercle rather large, about six across widest portion. Grooved lateral line scales well marked. Broad swath of naked skin between anus and insertions of pelvic fins; a midventral row of three small (spinulated) scales behind line connecting pelvic insertions.

Fins weakly developed with frail rays; first dorsal with slender spinous second ray tapering distally to fine tip that extends beyond origin of second dorsal when fin depressed; pectoral and pelvic fins fragile, tips of both fall short of vertical through anal origin; second dorsal short, poorly developed throughout; anal fin relatively high with stout rays.

Pyloric caeca few 6 (6–9) short, broad, stubby, about as long as broad (to length about twice width). Gonads in holotype relatively large with egg diameters from about 0.1 mm to 0.35 mm (larger individual, 36 mm HL, from CAS-SU 25439 had eggs to 0.5 mm).

Color mostly faded because of long preservation in ethanol. Somewhat tawny overall at time of examination, darker over abdomen and gill cover. Pelvics dark, all other fins now pale.

Size.—Probably to not more than about 25 cm TL.

Distribution.—Known only from the semi-enclosed basin encompassing the Sulu, Visayan, Mindanao, and Sibuyan seas in the Philippines, in 514–1344 m.

Etymology.—Named for C. Richard Robins, esteemed ichthyologist, mentor, and compassionate human.

Discussion and Comparisons.—In preparing my contribution for the FAO Species Catalogue *Gadiform Fishes of the World* (Cohen et al., 1990), I examined specimens of the genus *Trachonurus* from many different collections including those at BMNH, BPBM, BSKU, CAS, FSM, IOAN, ISH, LACM, USNM, and ZMMGU. At that time, most ichthyologists followed Marshall (1973) in recognizing only one valid species, *T. villosus*. After I examined specimens of *T. robinsi*, I realized there might be more than one species in the genus. The differences between groups that I perceived were different species were so minimal and subtle, and often with so much overlap, that diagnosing them was difficult. Furthermore, study specimens were, for the most part, from scattered localities with small samples from each. The situation has not improved much over the years, and many taxonomic problems still remain unresolved within this genus.

Trachonurus villosus, the type species of the genus, has been difficult to char-

Table 1. Ranges in selected measurements of five species of *Trachonurus*

	N	<i>robinsi</i> 24	<i>sentipellis</i> 14	<i>sulcaus</i> 35	<i>villosus</i> 3	<i>gagates</i> 43
TL (mm)		91+–223	81+–311+	91+–570+	120+–223	300–478+
HL (mm)		18.4–35.9	13–69	13.2–96.0	18.6–37.2	45.5–81.8
Following in percent of head length						
Snout		23–30	23–26	23–31	23–27	24–27
Preoral		14–20	14–18	12–18	14–17	12–17
Internasal		17–24	16–20	17–23	19	20–23
Interorbital		28–34	26–33	29–35	31–34	31–40
Orbit		29–36	27–37	25–33	29–30	25–30
Suborbital		9–11	8–12	11–15	11–12	13–15
Postorbital		39–46	38–52	40–55	38–42	50–55
Orbit-preop.		26–32	26–33	32–45	29–33	36–42
Upper jaw		28–33	28–37	33–39	30–33	34–39
Barbel		4–9	8–11	5–15	6+–11	4–8
Gill-slit		12–18	13–20	13–20	16	13–17
Prenal		146–167	135–154	136–170	148–158	140–190
Body depth		66–77	66–85	64–97	78–80	74–102
1D.–2D.		28–45	11–29	16–41	20–22	14–35
Ht. 1D.		59–81	48–64	38–64	55–56	45–53
Len. V.		34–67	30–40	27–49	—	30–42

acterize because of the small size (“8 inches long”) and delicate condition of the holotype (BMNH 1887.12.7.105). Günther (1887: 143) listed a second CHALLENGER specimen (“10 inches long,” BMNH 1887.12.7.106), taken south of the Philippine Islands, which Sazonov and Iwamoto (1992:78) erroneously (fide W. N. Eschmeyer, CAS, personal comm.) thought was a type specimen. I have been unable to allocate that specimen to a known species, partly owing to its poor condition.

The holotype of *T. villosus*, for which selected meristic and morphometric data are provided in Tables 1–3, has very small scales, and its scale-row counts (Table 3) are unusually high—markedly higher than those of *T. robinsi*. The number of spinules on scales between the lateral line and first dorsal are few for the 26 mm HL holotype, about five (according to N. R. Merrett of BMNH in lit. July 1995, who kindly provided additional information on the type). A 37 mm HL ALBATROSS specimen from off Japan also had five spinules (Fig. 2, upper). Comparable-sized specimens of *T. robinsi* have 7–11 spinules per scale (Fig. 2, lower). Additionally, the interorbital width is substantially greater than the orbit diameter, whereas in *T. robinsi* the measurements are about equal, or more usually, the orbit diameter is greater. How well the holotype represents the species is unknown, as I have been unable to locate other specimens collected in the vicinity of Japan that match its characters. Many more specimens of a good size series collected from near the type-locality are necessary to characterize *T. villosus* adequately.

My studies suggest that the Hawaiian population representing *T. sentipellis* deserves separate recognition, based in part on the ratio of suborbital width to orbit diameter, orbit-to-preopercle distance (Table 1), relatively sparse scale covering on gular and branchiostegal membranes, and total scale rows from origin of second dorsal fin to anal fin. *T. robinsi* is closely similar to *T. sentipellis* in body proportions and most meristic values, but it attains a smaller maximum size. Table 2, moreover, shows that *T. robinsi* has fewer pectoral fin rays and somewhat lower gill-raker and scale-row counts. Also, the presence in *T. robinsi* of individuals with six pelvic fin rays is twice as frequent as those with seven, the usual number for the genus.

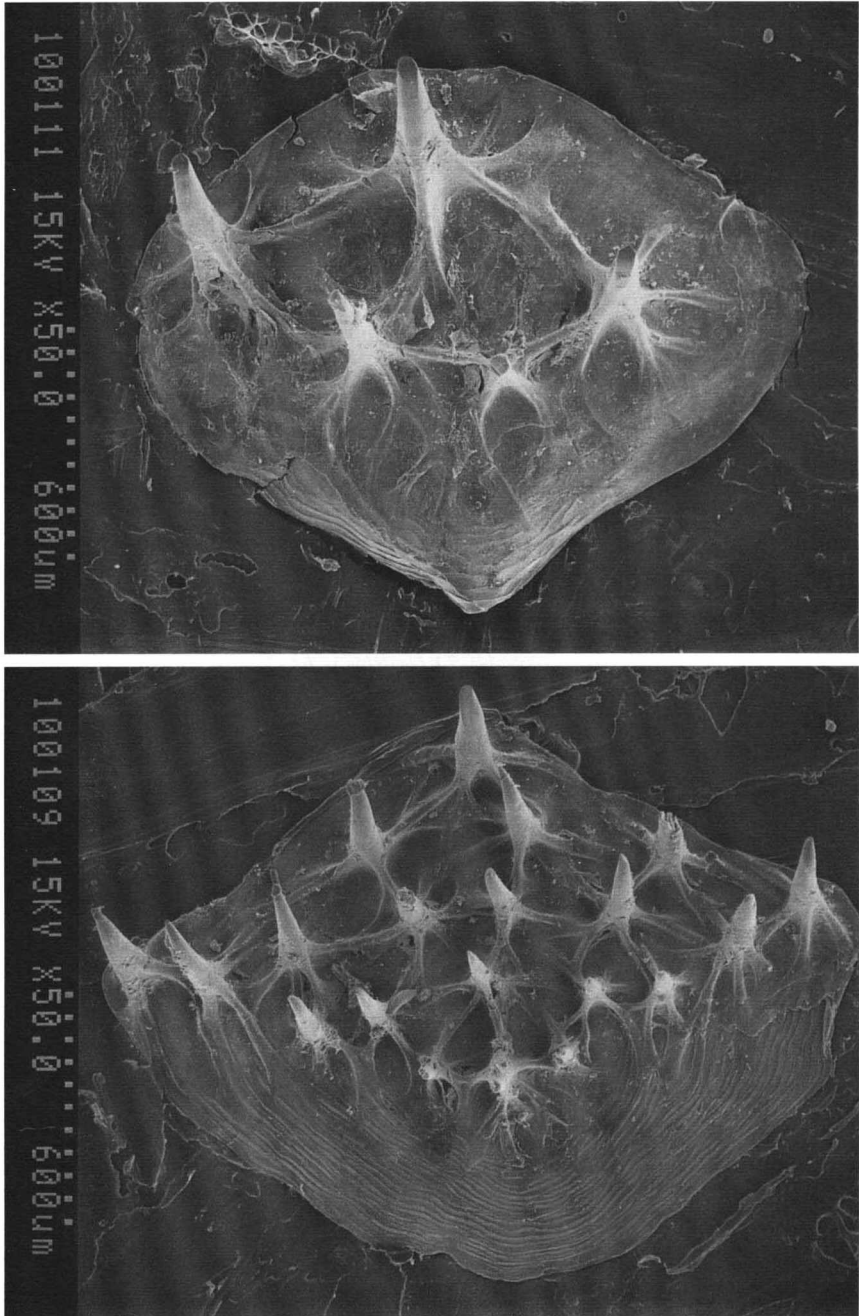


Figure 2. Scales from region below interspace of first and second dorsal fins (above lateral line). Upper, *Trachonurus villosus*, CAS-SU 22930 (37 mm HL); lower, *T. robinsi*, CAS-SU 25439 (paratype, 34 mm HL).

Trachonurus sulcatus Goode and Bean, 1885 from the Atlantic is a senior synonym of *T. asperimus* (Vaillant, 1888). The species appears to differ from *T. villosus* in having slightly greater dimensions of upper jaw length, suborbital width, and snout length. *Trachonurus sulcatus* differs from *T. robinsi* in having greater dimensions of suborbital, orbit-to-preopercle, upper jaw, and generally higher counts of pectoral fin rays, and gill rakers.

The recently described *T. gagates* Iwamoto and McMillan, 1997 from New Zealand and Australia is distinguished from all other species by its total lack of a grooved lateral line. Its small body scales and large body size further distinguish it from *T. robinsi*.

Gilbert and Hubbs (1920:564) recorded eight *Trachonurus* specimens from five localities (ALBATROSS stations 5348, 5586, 5587, 5646, and 5648) that lie immediately outside of the region that includes the Sulu Sea, Camotes Sea, Mindanao Sea, Sibuyan Sea, and Visayan Sea. These five basins are isolated from surrounding waters by a rim of islands and shallow waters—most of the rims lie at less than 200 m depth except through narrow passes. I examined five of the eight specimens (excluding those from stations 5586 and 5646) not knowing they were from outside the Sulu Sea region and immediately noticed their somewhat more compressed head, higher snout, deeper head, and slightly finer scale spination, as compared with specimens of *T. robinsi*. Measurements and counts from these showed notable differences in gill-raker counts, pyloric caeca count and shape, and proportional measurements of postorbital, orbit-to-preopercle, and upper jaw. These do not appear to be identifiable to any known species, so far as I can tell.

It is apparent that much remains to be done to clarify the species problems within this difficult genus of grenadiers. Additional characters that will aid in separating the different taxa are needed. Collections from the Indian Ocean and Australia that are available in other institutions have yet to be adequately examined. It is hoped that this paper will provide a preliminary basis from which further studies of the group can progress.

Type Specimens (all from Philippines).—Holotype: CAS-SU 25438 (♀, 30.7 mm HL, 207 mm TL); between Leyte and Mindanao; 9°06'30"N, 125°18'40"E; 1240 m; ALBATROSS st. 5494; 2 Aug. 1909.

Paratypes (14 spec.): CAS-SU 23944 (1, 26.2 HL, 155+ TL); e. coast Mindoro; 13°12'45"N, 121°38'45"E; 518 m; ALBATROSS st. 5123; 2 Feb. 1908. USNM 149766 (2, 27.2–30.5 HL, 164+–213 TL); off Leyte; 10°51'38"N, 124°20'54"E; 640 m; ALBATROSS st. 5407; 17 May 1909. CAS-SU 69755 (5, 18.4–35.4 HL, 125–211+ TL); same data as for holotype. USNM 149767 (3, 26.5–28.2 HL, 153+–173+ TL); Mindanao; 8°16'02"N, 123°58'26"E; 814 m; ALBATROSS st. 5512; 7 Aug. 1909. USNM 99439 (1, 21.3 HL, 111+ TL); Mindanao; 8°16'45"N, 124°02'48"E; 924 m; ALBATROSS st. 5513; 7 Aug. 1909. USNM 149771 (1, 32.7 HL, 223+ TL); Balicasag I., betw. Siquijor and Bohol Is.; 9°24'45"N, 123°39'15"E; 803 m; ALBATROSS st. 5528; 11 Aug. 1909. USNM 149774 (1, 34.1 HL, 216+ TL); Philippine Islands.

Other (non-type) specimens: CAS-SU 69756 (3, 24–26 HL, 163+–170 TL); same data as for CAS-SU 23944. USNM 119721 (3, 28.4–30.3 HL, 163+–183+ TL); e. coast Mindoro; 11°52'N, 121°48'30"E; 514 m; ALBATROSS st. 5124; 2 Feb. 1908. CAS-SU 25439 (5, 20.0–35.9 HL, 130–205+ TL); between Leyte and Mindanao; 9°12'45"N, 125°20'E; 1344 m; ALBATROSS st. 5492; 1 Aug. 1909.

Comparative Material.—(*Trachonurus gagates* specimens listed in original description by Iwamoto and McMillan, 1996).

Trachonurus sentipellis: USNM 47980 (holotype, 53.4 mm HL, 290 mm TL), ALBATROSS st. 3474; CAS-SU 8530 (3, 24.3–48.9 HL, 156–252 TL), no station no.; USNM 126072 (4, 15.3–68.8 HL, 84+–311+ TL), no station no.; USNM 55257 (6, 13.3–28.7 HL, 81+–178+ TL), no station no.; CAS 77318 (13.6 HL, 105 TL); TOWNSEND CROMWELL st. 71-3-9.

Trachonurus sulcatus: USNM 37336 (4, 13.2–31.2 mm HL, 86+–231 mm TL); USNM uncat. (6, 33.3–40.6 HL, 200+–286+ TL), OREGON st. 4149; USNM uncat. (68.6 HL, 356+ TL); OREGON II st. 11218; FSM 41340 (4, 47.6–51.3 HL, 256+–318+ TL); OREGON st. 4375; FSM 41371 (93.1 HL, 557+ TL); OREGON II st. 10956; FSM 39627 (96.0 HL, 570+ TL); OREGON st. 4566; FSM 24002

(68.6 HL, 410+ TL), OREGON st. 4883; FSM 41367 (2, 34.2–74.8 HL, 208+–440+ TL), OREGON II st. 10895; FSM 18184 (50.6 HL, 316+ TL), OREGON II st. 11196; FSM 41339 (35.1 HL, 201+ TL); OREGON st. 3561; FSM 18180 (29.5 HL, 206+ TL), OREGON II st. 11156; FSM 24001 (21.8 HL, 122+ TL), OREGON II st. 10828; FSM 41370 (2, 58.6–75.9 HL, 370+–477+ TL), OREGON II st. 10955; CAS uncat. (3, 47.3–56.7 HL, 274+–350+ TL), OREGON II st. 10874; CAS 24229 (3, 26.0–41.3 HL, 166+–234+ TL), OREGON st. 6697; ISH 2008/68 (62.1 HL, 350+ TL), WALTHER HERWIG st. 120/68; ISH 1970/68 (3, 51.8 HL, 74.6 TL), WALTHER HERWIG st. 103/68; ISH 1976/68 (50.9 HL, 315+ TL), WALTHER HERWIG st. 104/68.

Trachonurus villosus: BMNH 1887.12.7.105 (holotype, 26.2 mm HL, 177+ mm TL), CHALLENGER st. 214; CAS-SU 22930 (18.6–37.2 HL, 120+–223 TL); ALBATROSS st. 4971.

ACKNOWLEDGMENTS

My thanks to the many curators and staff of the following institutions for information and the loan of specimens: J. E. Randall, A. Suzumoto (BPBM); V. G. Springer, R. Vari, J. Williams, S. Jewett (USNM); N. R. Merrett, G. J. Howes, O. A. Crimmen (BMNH); C. R. Gilbert, G. Burgess (FSM); Y. I. Sazonov (ZMMGU); Y. N. Shcherbachev (IOAN); M. E. Anderson (RUSI). Various CAS staff assisted in numerous ways: S. Middleton (photograph of holotype of *T. robinsi*); D. Catania and J. Fong (specimen loans and preparation); Darrell Ubick (SEM). Thanks to W. N. Eschmeyer (CAS) and two anonymous reviewers for helpful comments that improved the manuscript.

LITERATURE CITED

- Cohen, D. M., T. Inada, T. Iwamoto, and N. Scialabba. 1990. FAO species catalogue. Gadiform fishes of the world (Order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date. FAO Fish. Synop. (125), 10: 442 p.
- Gilbert, C. H., and F. Cramer. 1897. Report on the fishes dredged in deep water near the Hawaiian Islands, with descriptions and figures of twenty-three new species. Proc. U.S. Natl. Mus. 19: 403–435, pls. 36–48.
- and C. L. Hubbs. 1920. The macrourid fishes of the Philippine Islands and the East Indies. Bull. U.S. Natl. Mus. 100, 1(7): 369–588.
- Goode, G. B. and T. H. Bean. 1885. Descriptions of new fishes obtained by the United States Fish Commission mainly from deep water off the Atlantic and Gulf coasts. Proc. U.S. Natl. Mus. 8: 589–605.
- Günther, A. 1877. Preliminary notes on new fishes collected in Japan during the expedition of H.M.S. 'Challenger.' Ann. Mag. Nat. Hist. Ser. 4, 20: 433–446.
- . 1887. Report on the deep-sea fishes collected by H.M.S. CHALLENGER during the years 1873–76. Rep. Sci. Res. H.M.S. Challenger 22 (Zool.) (pt. 1) [text]: i–lxv + 1–268; (pt. 2) [plates]: pls. 1–73.
- Iwamoto, T. 1970. The R/V Pillsbury Deep-Sea Biological Expedition to the Gulf of Guinea, 1964–65. 19. Macrourid fishes of the Gulf of Guinea. Stud. Trop. Oceanogr.(4) (pt.2): 316–431.
- and P. McMillan. 1997. A new grenadier, genus *Trachonurus*, from New Zealand and Australia (Macrouridae, Gadiformes, Pisces). Mem. Mus. Victoria 56(pt. 1): 255–259.
- and Y. I. Sazonov. 1988. A review of the southeastern Pacific *Coryphaenoides* (sensu lato) (Pisces, Gadiformes, Macrouridae). Proc. Calif. Acad. Sci. 45(3): 35–82, figs. 1–9.
- Leviton, A. E., R. H. Gibbs, Jr., E. Heal, and C. E. Dawson. 1985. Standards in herpetology and ichthyology: part I. Standard symbolic codes for institutional resource collections in herpetology and ichthyology. Copeia 1985 (3): 802–832.
- Marshall, N. B. 1973. Family Macrouridae. Pages 496–665, in D. M. Cohen, ed. Fishes of the western North Atlantic. Mem. Sears Found. Mar. Res. (1)(pt.6).
- Sazonov, Y. I., and T. Iwamoto. 1992. Grenadiers (Pisces, Gadiformes) of the Nazca and Sala y Gomez ridges, southeastern Pacific. Proc. Calif. Acad. Sci. 48(2): 27–95, figs. 1–37.
- Vaillant, L. L. 1888. Expéditions scientifiques du TRAVAILLEUR et du TALISMAN pendant les années 1880, 1881, 1882, 1883. Poissons. Paris, France, 406 p., 28 pls.

DATE ACCEPTED: January 29, 1996.

ADDRESS: Dept. of Ichthyology, California Academy of Sciences, Golden Gate Park, San Francisco, California 94118.